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New Mexico Bureau of Mines & Mineral Resources
Socorro, NM 87801

A DIVISION OF
NEW MEXICO INSTITUTE OF MINING & TECHNOLOGY

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FILE

Mr. Mike Brown
Manzano Oil Corp.
P.O. Box 2107
Roswell, NM 88202

Dear Mike:

Pursuant to your telephone call of September 10, I have examined the available literature and well data to determine the base of fresh groundwater in the vicinity of your soon-to-be-drilled No. 1 Cathead Mesa well (Sec. 8-T4S-R9E, Socorro County). A library search has not revealed any published reports on groundwater in this area. Published reports cover the Carrizozo area to the south (e.g. Cooper, 1965; Newcomer and Shomaker, 1991) and the northern part of Chupadera Mesa in Torrance County (Smith, 1957), but do not cover the southern part of Chupadera Mesa on which the prospect is located. Therefore, I have examined well data on file in the Bureau's Subsurface Library in conjunction with Bureau hydrogeologist Barry Allred and used it with the literature from neighboring areas to develop a picture of groundwater in the area.

As you have pointed out, the Standard of Heard No. 1 Federal well, located in Sec. 33-T6S-R9E, set 13 3/8" casing at a depth of 1446 ft and this can be considered the groundwater protection string for the well. The top of the Yeso is at 215 ft in this well. The sample log indicates that the Yeso contains significant anhydrite and salt beds below 400 ft. In all probability, the Yeso has a diminished potential to contain fresh water below this depth, although it is not impossible. To the northeast, in Sec. 1-T6S-R9E, we have a record of a water well drilled to a total depth 1005 ft. This well was spudded in Triassic strata and it is probable that the Triassic or perhaps the San Andres is the aquifer. It is dissimilar to the Heard well because the Heard well spudded in the San Andres. Because the Heard well is along structural strike with your prospect, it is likely that Yeso facies in the Heard well will be similar to those that will be encountered in your well. Given the evaporitic facies of the Yeso in this area, it would seem very unlikely that the Yeso will give fresh water below 800 ft or so. In all probability, Yeso water may be poor below 400 ft.

To the west of your prospect in Sec. 28-T4S-R6E, the Virgle Landreth No. 1 Panhandle A well was drilled unsuccessfully for oil and gas in 1973. Unpublished data in our files indicates that a fresh water aquifer was encountered from 470 to 495 ft in a sandstone in this well (Meseta Blanca Member of Yeso Formation). This is in the lower Yeso, about 300 ft above the top of the Abo. According to our unpublished data, the zone appears to be fairly widespread. This same zone is apparently present to the west in the Sun No. 1 Bingham State (Sec. 23-T5S-R5E), which was completed as a water well in this

interval. It is unlikely that this zone extends as far east as the Cathead Mesa prospect, however, because of the eastward facies change to evaporites, which is especially marked in the lower half of the Yeso.

Water in the northern part of Chupadera Mesa in southern Torrance County is obtained from the Yeso according to Smith (1957). Depths to water in this area range from 250 ft to 750 ft. According to Smith, well yields are small and the water is usable for stock or irrigation purposes, but not for domestic consumption. Quality is apparently better for water obtained from the upper part of the Yeso. At any rate, the Yeso apparently is far more evaporitic in the basinal area of the Heard and proposed Cathead Mesa wells than it is in southern Torrance County. Therefore, water quality is probably much poorer in the vicinity of your prospect.

It would seem unnecessary to set the groundwater protection string at a depth of 1400 ft in the Cathead Mesa well. A depth of 800 ft should be sufficient to protect water resources in the uppermost part of the Yeso as well as the San Andres and Glorieta aquifers.

Sincerely,

Ronald F. Broadhead
Assistant Director, Senior Petroleum Geologist

xc: Barry Allred, Hydrogeologist, NMBMMR
Roy Johnson, NMOCD

Cited references:

- Cooper, J.B., 1965, Ground-water resources in the northern Tularosa Basin near Carrizozo, Lincoln County, New Mexico: U.S. Geological Survey, Hydrologic Investigations Atlas, HA-193, 1 sheet.
- Newcomer, R.W., Jr., and Shomaker, J.W., 1991, Water resources of the Ruidoso-Carrizozo-Tularosa areas, Lincoln and Otero Counties, New Mexico: New Mexico Geological Society, Guidebook to 42nd field conference, pp. 339-341.
- Smith, R.E., 1957, Geology and ground-water resources of Torrance County, New Mexico: New Mexico Bureau of Mines and Mineral Resources. Ground-water report 5, 186 pp.